



1

SEQUENCE LISTING

<110> GUERIN-MARCHAND, CLAUDINE  
DRUILHE, PIERRE

<120> PEPTIDE SEQUENCES SPECIFIC FOR THE HEPATIC STAGES OF P. FALCIPARUM  
BEARING EPITOPES CAPABLE OF STIMULATING THE T LYMPHOCYTES

<130> 010830-118

<140> 09/900,963

<141> 2001-07-10

<150> 08/098,327

<151> 1993-11-24

<150> PCT/FR92/00104

<151> 1992-02-05

<150> FR 91 01286

<151> 1991-02-05

<160> 47

<170> PatentIn Ver. 3.3

<210> 1

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Formula Sequence

<220>

<221> VARIANT

<222> 8

<223> Xaa = Glu or Gly

<400> 1

Leu Ala Lys Glu Lys Leu Gln Xaa Gln Gln Ser Asp Leu Glu Gln Glu

1

5

10

15

Arg

<210> 2

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Formula Sequence

<220>

<221> VARIANT

<222> 1

<223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 6  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 8  
 <223> Xaa = Arg or Leu

<220>  
 <221> VARIANT  
 <222> 15  
 <223> Xaa = Glu or Gly

<400> 2  
 Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu Gln Xaa Gln  
           1                          5                          10                          15  
 Gln

<210> 3  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 2  
 <223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 7  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 9  
 <223> Xaa = Arg or Leu

<220>  
 <221> VARIANT  
 <222> 16  
 <223> Xaa = Glu or Gly

<400> 3  
 Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu Gln Xaa  
           1                          5                          10                          15  
 Gln

<210> 4  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 3  
 <223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 8  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 10  
 <223> Xaa = Arg or Leu

<220>  
 <221> VARIANT  
 <222> 17  
 <223> Xaa = Glu or Gly

<400> 4  
 Gln Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu Gln  
       1                  5                  10                  15  
 Xaa

<210> 5  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 1  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 4  
 <223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 9  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 11  
 <223> Xaa = Arg or Leu

<400> 5  
 Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu  
       1                  5                  10                  15  
 Gln

<210> 6  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 2  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 5  
 <223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 10  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 12  
 <223> Xaa = Arg or Leu

<400> 6  
 Gln Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys  
       1                  5                  10                  15  
 Leu

<210> 7  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 3  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 6  
 <223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 11  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 13  
 <223> Xaa = Arg or Leu

<400> 7  
 Leu Gln Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala Lys Glu  
           1                          5                          10                          15  
 Lys

<210> 8  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 4  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 7  
 <223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 12  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 14  
 <223> Xaa = Arg or Leu

<400> 8  
 Lys Leu Gln Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala Lys  
           1                          5                          10                          15  
 Glu

<210> 9  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 5  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 8  
 <223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 13  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 15  
 <223> Xaa = Arg or Leu

<400> 9  
 Glu Lys Leu Gln Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala  
           1                  5                  10                  15  
 Lys

<210> 10  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 6  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 9  
 <223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 14  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 16  
 <223> Xaa = Arg or Leu  
  
 <400> 10  
 Lys Glu Lys Leu Gln Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa  
   1                          5                          10                          15  
 Ala

<210> 11  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 7  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 10  
 <223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 15  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 17  
 <223> Xaa = Arg or Leu

<400> 11  
 Ala Lys Glu Lys Leu Gln Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg  
   1                          5                          10                          15  
 Xaa

<210> 12  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 1  
 <223> Xaa = Arg or Leu

<220>  
 <221> VARIANT  
 <222> 8  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 11  
 <223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 16  
 <223> Xaa = Glu or Asp

<400> 12  
 Xaa Ala Lys Glu Lys Leu Gln Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa  
           1                  5                  10                  15  
 Arg

<210> 13  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 2  
 <223> Xaa = Arg or Leu

<220>  
 <221> VARIANT  
 <222> 9  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 12  
 <223> Xaa = Ser or Arg

<220>  
 <221> VARIANT  
 <222> 17  
 <223> Xaa = Glu or Asp

<400> 13  
 Arg Xaa Ala Lys Glu Lys Leu Gln Xaa Gln Gln Xaa Asp Leu Glu Gln  
           1                  5                  10                  15  
 Xaa



<210> 14  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 1  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 3  
 <223> Xaa = Arg or Leu

<220>  
 <221> VARIANT  
 <222> 10  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 13  
 <223> Xaa = Ser or Arg

<400> 14  
 Xaa Arg Xaa Ala Lys Glu Lys Leu Gln Xaa Gln Gln Xaa Asp Leu Glu  
           1                  5                  10                  15  
 Gln

<210> 15  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 2  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 4  
 <223> Xaa = Arg or Leu

<220>  
 <221> VARIANT  
 <222> 11  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 14  
 <223> Xaa = Ser or Arg  
  
 <400> 15  
 Gln Xaa Arg Xaa Ala Lys Glu Lys Leu Gln Xaa Gln Gln Xaa Asp Leu  
   1                          5                          10                          15  
 Glu  
  
 <210> 16  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: Formula Sequence  
  
 <220>  
 <221> VARIANT  
 <222> 3  
 <223> Xaa = Glu or Asp  
  
 <220>  
 <221> VARIANT  
 <222> 5  
 <223> Xaa = Arg or Leu  
  
 <220>  
 <221> VARIANT  
 <222> 12  
 <223> Xaa = Glu or Gly  
  
 <220>  
 <221> VARIANT  
 <222> 15  
 <223> Xaa = Ser or Arg  
  
 <400> 16  
 Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu Gln Xaa Gln Gln Xaa Asp  
   1                          5                          10                          15  
 Leu  
  
 <210> 17  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: Formula Sequence  
  
 <220>  
 <221> VARIANT  
 <222> 4  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 6  
 <223> Xaa = Arg or Leu

<220>  
 <221> VARIANT  
 <222> 13  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 16  
 <223> Xaa = Ser or Arg

<400> 17  
 Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu Gln Xaa Gln Gln Xaa  
           1                          5                          10                          15  
 Asp

<210> 18  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Formula Sequence

<220>  
 <221> VARIANT  
 <222> 5  
 <223> Xaa = Glu or Asp

<220>  
 <221> VARIANT  
 <222> 7  
 <223> Xaa = Arg or Leu

<220>  
 <221> VARIANT  
 <222> 14  
 <223> Xaa = Glu or Gly

<220>  
 <221> VARIANT  
 <222> 17  
 <223> Xaa = Ser or Arg

<400> 18  
 Asp Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu Gln Xaa Gln Gln  
           1                          5                          10                          15  
 Xaa

&lt;210&gt; 19

&lt;211&gt; 107

&lt;212&gt; PRT

&lt;213&gt; Plasmodium falciparum

&lt;400&gt; 19

Arg Lys Ala Asp Thr Lys Lys Asn Leu Glu Arg Lys Lys Glu His Gly  
 1 5 10 15

Asp Ile Leu Ala Glu Asp Leu Tyr Gly Arg Leu Glu Ile Pro Ala Ile  
 20 25 30

Glu Leu Pro Ser Glu Asn Glu Arg Gly Tyr Tyr Ile Pro His Gln Ser  
 35 40 45

Ser Leu Pro Gln Asp Asn Arg Gly Asn Ser Arg Asp Ser Lys Glu Ile  
 50 55 60

Ser Ile Ile Glu Lys Thr Asn Arg Glu Ser Ile Thr Thr Asn Val Glu  
 65 70 75 80

Gly Arg Arg Asp Ile His Lys Gly His Leu Glu Glu Lys Lys Asp Gly  
 85 90 95

Ser Ile Lys Pro Glu Gln Lys Glu Asp Lys Ser  
 100 105

&lt;210&gt; 20

&lt;211&gt; 117

&lt;212&gt; PRT

&lt;213&gt; Plasmodium falciparum

&lt;400&gt; 20

Leu Gln Glu Gln Gln Arg Asp Leu Glu Gln Arg Lys Ala Asp Thr Lys  
 1 5 10 15

Lys Asn Leu Glu Arg Lys Lys Glu His Gly Asp Ile Leu Ala Glu Asp  
 20 25 30

Leu Tyr Gly Arg Leu Glu Ile Pro Ala Ile Glu Leu Pro Ser Glu Asn  
 35 40 45

Glu Arg Gly Tyr Tyr Ile Pro His Gln Ser Ser Leu Pro Gln Asp Asn  
 50 55 60

Arg Gly Asn Ser Arg Asp Ser Lys Glu Ile Ser Ile Ile Glu Lys Thr  
 65 70 75 80

Asn Arg Glu Ser Ile Thr Thr Asn Val Glu Gly Arg Arg Asp Ile His  
 85 90 95

Lys Gly His Leu Glu Glu Lys Lys Asp Gly Ser Ile Lys Pro Glu Gln  
 100 105 110

Lys Glu Asp Lys Ser  
 115

&lt;210&gt; 21

&lt;211&gt; 27

&lt;212&gt; PRT

&lt;213&gt; Plasmodium falciparum

&lt;400&gt; 21

Asp Thr Lys Lys Asn Leu Glu Arg Lys Lys Glu His Gly Asp Ile Leu  
 1 5 10 15

Ala Glu Asp Leu Tyr Gly Arg Leu Glu Ile Pro  
 20 25

&lt;210&gt; 22

&lt;211&gt; 24

&lt;212&gt; PRT

&lt;213&gt; Plasmodium falciparum

&lt;400&gt; 22

Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Arg Asp Leu Glu  
 1 5 10 15

Gln Arg Lys Ala Asp Thr Lys Lys  
 20

&lt;210&gt; 23

&lt;211&gt; 31

&lt;212&gt; PRT

&lt;213&gt; Plasmodium falciparum

&lt;400&gt; 23

Asn Ser Arg Asp Ser Lys Glu Ile Ser Ile Ile Glu Lys Thr Asn Arg  
 1 5 10 15

Glu Ser Ile Thr Thr Asn Val Glu Gly Arg Arg Asp Ile His Lys  
 20 25 30

&lt;210&gt; 24

&lt;211&gt; 151

&lt;212&gt; PRT

&lt;213&gt; Plasmodium falciparum

&lt;400&gt; 24

Arg Asp Glu Leu Phe Asn Glu Leu Leu Asn Ser Val Asp Val Asn Gly  
 1 5 10 15

Glu Val Lys Glu Asn Ile Leu Glu Glu Ser Gln Val Asn Glu Asp Ile  
 20 25 30

Phe Asn Ser Leu Val Lys Ser Val Gln Gln Glu Gln Gln His Asn Val  
 35 40 45

Glu Glu Lys Val Glu Glu Ser Val Glu Glu Asn Asp Glu Glu Ser Val  
 50 55 60

14

Glu Glu Asn Val Glu Glu Asn Val Glu Glu Asn Asp Asp Gly Ser Val  
65 70 75 80  
Ala Ser Ser Val Glu Glu Ser Ile Ala Ser Ser Val Asp Glu Ser Ile  
85 90 95  
Asp Ser Ser Ile Glu Glu Asn Val Ala Pro Thr Val Glu Glu Ile Val  
100 105 110  
Ala Pro Thr Val Glu Glu Ile Val Ala Pro Ser Val Val Glu Lys Cys  
115 120 125  
Ala Pro Ser Val Glu Glu Ser Val Ala Pro Ser Val Glu Glu Ser Val  
130 135 140  
Ala Glu Met Leu Lys Glu Arg  
145 150

<210> 25  
<211> 47  
<212> PRT  
<213> Plasmodium falciparum

<400> 25  
Arg Asp Glu Leu Phe Asn Glu Leu Leu Asn Ser Val Asp Val Asn Gly  
1 5 10 15  
Glu Val Lys Glu Asn Ile Leu Glu Glu Ser Gln Val Asn Asp Asp Ile  
20 25 30  
Phe Asn Ser Leu Val Lys Ser Val Gln Gln Glu Gln Gln His Asn  
35 40 45

<210> 26  
<211> 26  
<212> PRT  
<213> Plasmodium falciparum

<400> 26  
Asp Glu Leu Phe Asn Glu Leu Leu Asn Ser Val Asp Val Asn Gly Glu  
1 5 10 15  
Val Lys Glu Asn Ile Leu Glu Glu Ser Gln  
20 25

<210> 27  
<211> 27  
<212> PRT  
<213> Plasmodium falciparum

<400> 27  
Leu Glu Glu Ser Gln Val Asn Asp Asp Ile Phe Ser Asn Ser Leu Val  
1 5 10 15

15

Lys Ser Val Gln Gln Glu Gln Gln His Asn Val  
20 25

<210> 28

<211> 27

<212> PRT

<213> Plasmodium falciparum

<400> 28

Val Glu Lys Cys Ala Pro Ser Val Glu Glu Ser Val Ala Pro Ser Val  
1 5 10 15

Glu Glu Ser Val Ala Glu Met Leu Lys Glu Arg  
20 25

<210> 29

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic Primer

<400> 29

ttgttctaga tcgcttt

17

<210> 30

<211> 15

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic Primer

<400> 30

aaagaagata aatct

15

<210> 31

<211> 316

<212> PRT

<213> Plasmodium falciparum

<400> 31

Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln  
1 5 10 15

Gln Ser Asp Leu Glu Gln Asp Arg Leu Ala Lys Glu Lys Leu Gln Glu  
20 25 30

Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys Glu Lys Leu Gln  
35 40 45

Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu  
50 55 60

Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys  
 65 70 75 80  
 Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg Leu Ala Lys Glu  
 85 90 95  
 Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys  
 100 105 110  
 Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala  
 115 120 125  
 Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu  
 130 135 140  
 Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg  
 145 150 155 160  
 Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu  
 165 170 175  
 Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln  
 180 185 190  
 Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Arg Asp Leu Glu  
 195 200 205  
 Gln Arg Lys Ala Asp Thr Lys Lys Asn Leu Glu Arg Lys Lys Glu His  
 210 215 220  
 Gly Asp Ile Leu Ala Glu Asp Leu Tyr Gly Arg Leu Glu Ile Pro Ala  
 225 230 235 240  
 Ile Glu Leu Pro Ser Glu Asn Glu Arg Gly Tyr Tyr Ile Pro His Gln  
 245 250 255  
 Ser Ser Leu Pro Gln Asp Asn Arg Gly Asn Ser Arg Asp Ser Lys Glu  
 260 265 270  
 Ile Ser Ile Ile Glu Lys Thr Asn Arg Glu Ser Ile Thr Thr Asn Val  
 275 280 285  
 Glu Gly Arg Arg Asp Ile His Lys Gly His Leu Glu Glu Lys Lys Asp  
 290 295 300  
 Gly Ser Ile Lys Pro Glu Gln Lys Glu Asp Lys Ser  
 305 310 315

&lt;210&gt; 32

&lt;211&gt; 950

&lt;212&gt; DNA

&lt;213&gt; Plasmodium falciparum

&lt;400&gt; 32

aaagcgatct agaacaagag agacgtgcta aagaaaagtt gcaagaacaa caaagcgatt 60  
 tagaacaaga tagacttgct aaagaaaagt tacaagagca gcaaagcgat ttagaacaag 120  
 agagacttgc taaagaaaag ttgcaagaac acaaaagcga tctagaacaa gagagacgtg 180



```

ctaaagaaaa gttgcaagaa caacaaagcg atttagaaca agagagacgt gctaaagaaa 240
agttgcaaga acaacaaagc gatttagaac aagatagact tgctaaagaa aagttacaag 300
agcagcaaaag cgatttagaa caagagagac gtgctaaaga aaagttgcaa gaacaacaaa 360
gcgatttaga acaagagaga cgtgctaaag aaaagttgca agaacaacaa agcgatttag 420
aacaagagag acttgctaaa gaaaagttgc aagaacaaca aagcgattta gaacaagaga 480
gacgtgctaa agaaaagttg caagaacaac aaagcgattt agaacaagag agacgtgcta 540
aagaaaagtt gcaagaacaa caaagcgatt tagaacaaga gagacgtgct aaagaaaagt 600
tgcaagagca gcaaagagat ttagaacaaa ggaagctga tacgaaaaaa aatttagaaa 660
gaaaaaagga acatggagat atattagcag aggatttata tggtcgttta gaaataccag 720
ctatagaact tccatcagaa aatgaacgtg gatattatat accacatcaa tcttctttac 780
ctcaggacaa cagagggaaat agtagagatt ccaaggaaat atctataata gaaaaacaa 840
atagagaatc tattacaaca aatgttgaag gacgaaggga tatacataaa ggacatcttg 900
aagaaaagaa agatggttca ataaaaccag aacaaaaaga agataaatct 950

```

&lt;210&gt; 33

&lt;211&gt; 464

&lt;212&gt; DNA

&lt;213&gt; Plasmodium falciparum

&lt;400&gt; 33

```

gaattccgtg atgaactttt taatgaatta ttaaatagtg tagatgttaa tggagaagta 60
aaagaaaata ttttggagga aagtcaagtt aatgaggata tttttaatag tttagtaaaa 120
agtgttcaac aagaacaaca acacaatggt gaagaaaaag ttgaagaaag tgtagaagaa 180
aatgacgaag aaagtgtaga agaaaatgta gaagaaaatg tagaagaaaa tgacgacgga 240
agtgtagcct caagtgttga agaaagtata gcttcaagtg ttgatgaaag tatagattca 300
agtattgaag aaaatgtagc tccaactggt gaagaaatcg tagctccaac tgttgaagaa 360
attgtagctc caagtgttgt agaaaagtggt gctccaagtg ttgaagaaag tgtagctcca 420
agtgttgaag aaagtgtagc tgaaatgttg aaggaaagga attc 464

```

&lt;210&gt; 34

&lt;211&gt; 988

&lt;212&gt; DNA

&lt;213&gt; Plasmodium falciparum

&lt;400&gt; 34

```

aaagtataca tcttccttct ttacttctta aaatgaaaca tattttgtac atatcatttt 60
actttatcct tgtttaattta ttgatatttc atataaatgg aaagataata aagaattctg 120
aaaaagatga aatcataaaa tctaacttga gaagtgggtc ttcaaattct aggaatcgaa 180
taaagttaga aaatcacgag aagaaacacg ttttatctca taattcatat gagaaaacta 240
aaaataatga aaataataaaa tttttcgata aggataaaga gttaacgatg tctaattgtaa 300
aaaatgtgtc acaaacaaat ttcaaaagtc ttttaagaaa tcttggtgtt tcagagaata 360
tattccttaa agaaaataaa ttaaataagg aagggaaatt aattgaacac ataataaatg 420
atgatgacga taaaaaaaaa tatattaaag ggcaagacga aaacagacaa gaagatcttg 480
aagaaaaagc agctaaagaa aagttacagg ggcaacaaag cgattcagaa caagagagac 540
gtgctaaaga aaagttgcaa gaacaacaaa gcgatttaga acaagagaga cttgctaaag 600
aaaagttgca agaacaacaa agcgatttag aacaagagag acgtgctaaa gaaaagttgc 660
aagaacaaca aagcgattta gaacaagaga gacttgctaa agaaaagttg caagaacaac 720
aaagcgattt agaacaagag agacgtgcta aagaaaagtt gcaagaacaa caaagcgatt 780
tagaacaaga gagacgtgct aaagaaaagt tgcaagaaca acaaagcgat ttagaacaag 840
agagacttgc taaagaaaag ttacaagagc agcaaagcga tttagaacaa gatagacttg 900
ctaaagaaaa gttgcaagaa caacaaagcg atttagaaca agagagacgt gctaaagaaa 960
ggttgcaaga acaacaaagc gatttaga 988

```

&lt;210&gt; 35

&lt;211&gt; 12

&lt;212&gt; DNA

&lt;213&gt; Plasmodium falciparum

```

<400> 35
atgaaacata tt 12

<210> 36
<211> 12
<212> DNA
<213> Plasmodium falciparum

<400> 36
aagcgattta ga 12

<210> 37
<211> 954
<212> DNA
<213> Plasmodium falciparum

<221> CDS
<222> (1)..(954)

<400> 37
atg aaa cat att ttg tac ata tca ttt tac ttt atc ctt gtt aat tta 48
Met Lys His Ile Leu Tyr Ile Ser Phe Tyr Phe Ile Leu Val Asn Leu
1 5 10 15

ttg ata ttt cat ata aat gga aag ata ata aag aat tct gaa aaa gat 96
Leu Ile Phe His Ile Asn Gly Lys Ile Ile Lys Asn Ser Glu Lys Asp
20 25 30

gaa atc ata aaa tct aac ttg aga agt ggt tct tca aat tct agg aat 144
Glu Ile Ile Lys Ser Asn Leu Arg Ser Gly Ser Ser Asn Ser Arg Asn
35 40 45

cga ata aat gag gaa aat cac gag aag aaa cac gtt tta tct cat aat 192
Arg Ile Asn Glu Glu Asn His Glu Lys Lys His Val Leu Ser His Asn
50 55 60

tca tat gag aaa act aaa aat aat gaa aat aat aaa ttt ttc gat aag 240
Ser Tyr Glu Lys Thr Lys Asn Asn Glu Asn Asn Lys Phe Phe Asp Lys
65 70 75 80

gat aaa gag tta acg atg tct aat gta aaa aat gtg tca caa aca aat 288
Asp Lys Glu Leu Thr Met Ser Asn Val Lys Asn Val Ser Gln Thr Asn
85 90 95

ttc aaa agt ctt tta aga aat ctt ggt gtt tca gag aat ata ttc ctt 336
Phe Lys Ser Leu Leu Arg Asn Leu Gly Val Ser Glu Asn Ile Phe Leu
100 105 110

aaa gaa aat aaa tta aat aag gaa ggg aaa tta att gaa cac ata ata 384
Lys Glu Asn Lys Leu Asn Lys Glu Gly Lys Leu Ile Glu His Ile Ile
115 120 125

aat gat gat gac gat aaa aaa aaa tat att aaa ggg caa gac gaa aac 432
Asn Asp Asp Asp Asp Lys Lys Lys Tyr Ile Lys Gly Gln Asp Glu Asn
130 135 140

```

```

aga caa gaa gat ctt gaa gaa aaa gca gct aaa gaa aag tta cag ggg 480
Arg Gln Glu Asp Leu Glu Glu Lys Ala Ala Lys Glu Lys Leu Gln Gly
145 150 155 160

caa caa agc gat tca gaa caa gag aga cgt gct aaa gaa aag ttg caa 528
Gln Gln Ser Asp Ser Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln
165 170 175

gaa caa caa agc gat tta gaa caa gag aga ctt gct aaa gaa aag ttg 576
Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys Glu Lys Leu
180 185 190

caa gaa caa caa agc gat tta gaa caa gag aga cgt gct aaa gaa aag 624
Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys
195 200 205

ttg caa gaa caa caa agc gat tta gaa caa gag aga ctt gct aaa gaa 672
Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys Glu
210 215 220

aag ttg caa gaa caa caa agc gat tta gaa caa gag aga cgt gct aaa 720
Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys
225 230 235 240

gaa aag ttg caa gaa caa caa agc gat tta gaa caa gag aga cgt gct 768
Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala
245 250 255

aaa gaa aag ttg caa gaa caa caa agc gat tta gaa caa gag aga ctt 816
Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu
260 265 270

gct aaa gaa aag tta caa gag cag caa agc gat tta gaa caa gat aga 864
Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg
275 280 285

ctt gct aaa gaa aag ttg caa gaa caa caa agc gat tta gaa caa gag 912
Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu
290 295 300

aga cgt gct aaa gaa agg ttg caa gaa caa caa agc gat tta 954
Arg Arg Ala Lys Glu Arg Leu Gln Glu Gln Gln Ser Asp Leu
305 310 315

```

&lt;210&gt; 38

&lt;211&gt; 318

&lt;212&gt; PRT

&lt;213&gt; Plasmodium falciparum

&lt;400&gt; 38

```

Met Lys His Ile Leu Tyr Ile Ser Phe Tyr Phe Ile Leu Val Asn Leu
1 5 10 15

```

```

Leu Ile Phe His Ile Asn Gly Lys Ile Ile Lys Asn Ser Glu Lys Asp
20 25 30

```

Glu Ile Ile Lys Ser Asn Leu Arg Ser Gly Ser Ser Asn Ser Arg Asn  
                   35                                  40                                  45  
 Arg Ile Asn Glu Glu Asn His Glu Lys Lys His Val Leu Ser His Asn  
                   50                                  55                                  60  
 Ser Tyr Glu Lys Thr Lys Asn Asn Glu Asn Asn Lys Phe Phe Asp Lys  
                   65                                  70                                  75                                  80  
 Asp Lys Glu Leu Thr Met Ser Asn Val Lys Asn Val Ser Gln Thr Asn  
                                   85                                  90                                  95  
 Phe Lys Ser Leu Leu Arg Asn Leu Gly Val Ser Glu Asn Ile Phe Leu  
                                   100                                  105                                  110  
 Lys Glu Asn Lys Leu Asn Lys Glu Gly Lys Leu Ile Glu His Ile Ile  
                   115                                  120                                  125  
 Asn Asp Asp Asp Asp Lys Lys Lys Tyr Ile Lys Gly Gln Asp Glu Asn  
                   130                                  135                                  140  
 Arg Gln Glu Asp Leu Glu Glu Lys Ala Ala Lys Glu Lys Leu Gln Gly  
                   145                                  150                                  155                                  160  
 Gln Gln Ser Asp Ser Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln  
                                   165                                  170                                  175  
 Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys Glu Lys Leu  
                                   180                                  185                                  190  
 Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys  
                                   195                                  200                                  205  
 Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys Glu  
                   210                                  215                                  220  
 Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys  
                   225                                  230                                  235                                  240  
 Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala  
                                   245                                  250                                  255  
 Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu  
                                   260                                  265                                  270  
 Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg  
                   275                                  280                                  285  
 Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu  
                   290                                  295                                  300  
 Arg Arg Ala Lys Glu Arg Leu Gln Glu Gln Gln Ser Asp Leu  
                   305                                  310                                  315

<210> 39  
 <211> 1493  
 <212> DNA  
 <213> Plasmodium falciparum

<400> 39  
 caagaacaac aaagcgatct agaacaagag agacgtgcta aagaaaagtt gcaagaacaa 60  
 caaagcgatt tagaacaaga tagacttgct aaagaaaagt tacaagagca gcaaagcgat 120  
 ttagaacaag agagacttgc taagaaaagt tgcaagaaca acaaagcgat ctagaacaag 180  
 agagacgtgc taaagaaaag ttgcaagaac acaaaagcga ttagaacaag gagagacgtg 240  
 ctaaagaaaa gttgcaagaa caacaaagcg atttagaaca agatagactt gctaaagaaa 300  
 agttacaaga gcagcaaaagc gatttagaac aagagagacg tgctaaagaa aagttgcaag 360  
 aacaacaaag cgatttagaa caagagagac gtgctaagaa aagttgcaag aacaacaaag 420  
 cgatttagaa caagagagac ttgctaaaga aaagttgcaa gaacaacaaa gcgatttaga 480  
 acaagagaga cgtgctaaag aaaagttgca agaacaacaa agcgatttag aacaagagag 540  
 acgtgctaag aaaagttgca agaacaacaa agcgatttag aacaagagag acgtgctaaa 600  
 gaaaagttgc aagagcagca aagagattta gaacaaagga aggctgatac gaaaaaaaat 660  
 ttagaaaagaa aaaaggaaca tggagatata ttagcagagg atttatatgg tcgttttagaa 720  
 ataccagcta tagaacttcc atcagaaaat gaacgtggat attatatacc acatcaatct 780  
 tctttacctc aggacaacag agggaaatag agagattcca aggaaatatc tataatagaa 840  
 aaaaacaaata gagaatctat tacaacaaat gttgaaggac gaagggatat acataaagga 900  
 catcttgaag aaaagaaaga tggttcaata aaaccagaac aaaaagaaga taaatctgct 960  
 gacatacaaa atcatacatt agagacagta aatatttctg atgttaatga ttttcaaata 1020  
 agtaagtatg aggatgaaat aagtgctgaa tatgacgatt cattaataga tgaagaagaa 1080  
 gatgatgaag acttagacga atttaagcct attgtgcaat atgacaattt ccaagatgaa 1140  
 gaaaacatag gaatttataa agaactagaa gatttgatag agaaaaatga aaatttagat 1200  
 gatttagatg aaggaataga aaaatcatca gaagaattat ctgaagaaaa aataaaaaaa 1260  
 ggaaagaaat atgaaaaaac aaaggataat aattttaaac caaatgataa aagtttgtat 1320  
 gatgagcata ttaaaaaata taaaaatgat aagcaggtaa ataaggaaaa ggaaaaattc 1380  
 ataaaatcat tgtttcatat atttgacgga gacaatgaaa ttttacagat cgtggatgag 1440  
 ttatctgaag atataactaa atatttttatg aaactataaa aggttatata ttt 1493

<210> 40  
 <211> 12  
 <212> DNA  
 <213> Plasmodium falciparum

<400> 40  
 caagaacaac aa 12

<210> 41  
 <211> 12  
 <212> DNA  
 <213> Plasmodium falciparum

<400> 41  
 gggtatatat tt 12

<210> 42  
 <211> 1494  
 <212> DNA  
 <213> Plasmodium falciparum

<221> CDS  
 <222> (1)..(1494)

&lt;400&gt; 42

caa gaa caa caa agc gat cta gaa caa gag aga cgt gct aaa gaa aag	48
Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys	
1 5 10 15	
ttg caa gaa caa caa agc gat tta gaa caa gat aga ctt gct aaa gaa	96
Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg Leu Ala Lys Glu	
20 25 30	
aag tta caa gag cag caa agc gat tta gaa caa gag aga ctt gct aaa	144
Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys	
35 40 45	
gaa aag ttg caa gaa caa caa agc gat cta gaa caa gag aga cgt gct	192
Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala	
50 55 60	
aaa gaa aag ttg caa gaa caa caa agc gat tta gaa caa gag aga cgt	240
Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg	
65 70 75 80	
gct aaa gaa aag ttg caa gaa caa caa agc gat tta gaa caa gat aga	288
Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg	
85 90 95	
ctt gct aaa gaa aag tta caa gag cag caa agc gat tta gaa caa gag	336
Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu	
100 105 110	
aga cgt gct aaa gaa aag ttg caa gaa caa caa agc gat tta gaa caa	384
Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln	
115 120 125	
gag aga cgt gct aaa gaa aag ttg caa gaa caa caa agc gat tta gaa	432
Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu	
130 135 140	
caa gag aga ctt gct aaa gaa aag ttg caa gaa caa caa agc gat tta	480
Gln Glu Arg Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu	
145 150 155 160	
gaa caa gag aga cgt gct aaa gaa aag ttg caa gaa caa caa agc gat	528
Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp	
165 170 175	
tta gaa caa gag aga cgt gct aaa gaa aag ttg caa gaa caa caa agc	576
Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser	
180 185 190	
gat tta gaa caa gag aga cgt gct aaa gaa aag ttg caa gag cag caa	624
Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln	
195 200 205	
aga gat tta gaa caa agg aag gct gat acg aaa aaa aat tta gaa aga	672
Arg Asp Leu Glu Gln Arg Lys Ala Asp Thr Lys Lys Asn Leu Glu Arg	
210 215 220	

aaa aag gaa cat gga gat ata tta gca gag gat tta tat ggt cgt tta	720
Lys Lys Glu His Gly Asp Ile Leu Ala Glu Asp Leu Tyr Gly Arg Leu	
225 230 235 240	
gaa ata cca gct ata gaa ctt cca tca gaa aat gaa cgt gga tat tat	768
Glu Ile Pro Ala Ile Glu Leu Pro Ser Glu Asn Glu Arg Gly Tyr Tyr	
245 250 255	
ata cca cat caa tct tct tta cct cag gac aac aga ggg aat agt aga	816
Ile Pro His Gln Ser Ser Leu Pro Gln Asp Asn Arg Gly Asn Ser Arg	
260 265 270	
gat tcc aag gaa ata tct ata ata gaa aaa aca aat aga gaa tct att	864
Asp Ser Lys Glu Ile Ser Ile Ile Glu Lys Thr Asn Arg Glu Ser Ile	
275 280 285	
aca aca aat gtt gaa gga cga agg gat ata cat aaa gga cat ctt gaa	912
Thr Thr Asn Val Glu Gly Arg Arg Asp Ile His Lys Gly His Leu Glu	
290 295 300	
gaa aag aaa gat ggt tca ata aaa cca gaa caa aaa gaa gat aaa tct	960
Glu Lys Lys Asp Gly Ser Ile Lys Pro Glu Gln Lys Glu Asp Lys Ser	
305 310 315 320	
gct gac ata caa aat cat aca tta gag aca gta aat att tct gat gtt	1008
Ala Asp Ile Gln Asn His Thr Leu Glu Thr Val Asn Ile Ser Asp Val	
325 330 335	
aat gat ttt caa ata agt aag tat gag gat gaa ata agt gct gaa tat	1056
Asn Asp Phe Gln Ile Ser Lys Tyr Glu Asp Glu Ile Ser Ala Glu Tyr	
340 345 350	
gac gat tca tta ata gat gaa gaa gaa gat gat gaa gac tta gac gaa	1104
Asp Asp Ser Leu Ile Asp Glu Glu Glu Asp Asp Glu Asp Leu Asp Glu	
355 360 365	
ttt aag cct att gtg caa tat gac aat ttc caa gat gaa gaa aac ata	1152
Phe Lys Pro Ile Val Gln Tyr Asp Asn Phe Gln Asp Glu Glu Asn Ile	
370 375 380	
gga att tat aaa gaa cta gaa gat ttg ata gag aaa aat gaa aat tta	1200
Gly Ile Tyr Lys Glu Leu Glu Asp Leu Ile Glu Lys Asn Glu Asn Leu	
385 390 395 400	
gat gat tta gat gaa gga ata gaa aaa tca tca gaa gaa tta tct gaa	1248
Asp Asp Leu Asp Glu Gly Ile Glu Lys Ser Ser Glu Glu Leu Ser Glu	
405 410 415	
gaa aaa ata aaa aaa gga aag aaa tat gaa aaa aca aag gat aat aat	1296
Glu Lys Ile Lys Lys Gly Lys Lys Tyr Glu Lys Thr Lys Asp Asn Asn	
420 425 430	
ttt aaa cca aat gat aaa agt ttg tat gat gag cat att aaa aaa tat	1344
Phe Lys Pro Asn Asp Lys Ser Leu Tyr Asp Glu His Ile Lys Lys Tyr	
435 440 445	

aaa aat gat aag cag gtt aat aag gaa aag gaa aaa ttc ata aaa tca 1392  
 Lys Asn Asp Lys Gln Val Asn Lys Glu Lys Glu Lys Phe Ile Lys Ser  
 450 455 460  
  
 ttg ttt cat ata ttt gac gga gac aat gaa att tta cag atc gtg gat 1440  
 Leu Phe His Ile Phe Asp Gly Asp Asn Glu Ile Leu Gln Ile Val Asp  
 465 470 475 480  
  
 gag tta tct gaa gat ata act aaa tat ttt atg aaa cta taa aag gtt 1488  
 Glu Leu Ser Glu Asp Ile Thr Lys Tyr Phe Met Lys Leu  
 485 490  
  
 ata tat 1494

<210> 43

<211> 493

<212> PRT

<213> Plasmodium falciparum

<400> 43

Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys  
 1 5 10 15  
  
 Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg Leu Ala Lys Glu  
 20 25 30  
  
 Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys  
 35 40 45  
  
 Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala  
 50 55 60  
  
 Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg  
 65 70 75 80  
  
 Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg  
 85 90 95  
  
 Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu  
 100 105 110  
  
 Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln  
 115 120 125  
  
 Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu  
 130 135 140  
  
 Gln Glu Arg Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu  
 145 150 155 160  
  
 Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp  
 165 170 175  
  
 Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser  
 180 185 190



Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln  
 195 200 205  
 Arg Asp Leu Glu Gln Arg Lys Ala Asp Thr Lys Lys Asn Leu Glu Arg  
 210 215 220  
 Lys Lys Glu His Gly Asp Ile Leu Ala Glu Asp Leu Tyr Gly Arg Leu  
 225 230 235 240  
 Glu Ile Pro Ala Ile Glu Leu Pro Ser Glu Asn Glu Arg Gly Tyr Tyr  
 245 250 255  
 Ile Pro His Gln Ser Ser Leu Pro Gln Asp Asn Arg Gly Asn Ser Arg  
 260 265 270  
 Asp Ser Lys Glu Ile Ser Ile Ile Glu Lys Thr Asn Arg Glu Ser Ile  
 275 280 285  
 Thr Thr Asn Val Glu Gly Arg Arg Asp Ile His Lys Gly His Leu Glu  
 290 295 300  
 Glu Lys Lys Asp Gly Ser Ile Lys Pro Glu Gln Lys Glu Asp Lys Ser  
 305 310 315 320  
 Ala Asp Ile Gln Asn His Thr Leu Glu Thr Val Asn Ile Ser Asp Val  
 325 330 335  
 Asn Asp Phe Gln Ile Ser Lys Tyr Glu Asp Glu Ile Ser Ala Glu Tyr  
 340 345 350  
 Asp Asp Ser Leu Ile Asp Glu Glu Glu Asp Asp Glu Asp Leu Asp Glu  
 355 360 365  
 Phe Lys Pro Ile Val Gln Tyr Asp Asn Phe Gln Asp Glu Glu Asn Ile  
 370 375 380  
 Gly Ile Tyr Lys Glu Leu Glu Asp Leu Ile Glu Lys Asn Glu Asn Leu  
 385 390 395 400  
 Asp Asp Leu Asp Glu Gly Ile Glu Lys Ser Ser Glu Glu Leu Ser Glu  
 405 410 415  
 Glu Lys Ile Lys Lys Gly Lys Lys Tyr Glu Lys Thr Lys Asp Asn Asn  
 420 425 430  
 Phe Lys Pro Asn Asp Lys Ser Leu Tyr Asp Glu His Ile Lys Lys Tyr  
 435 440 445  
 Lys Asn Asp Lys Gln Val Asn Lys Glu Lys Glu Lys Phe Ile Lys Ser  
 450 455 460  
 Leu Phe His Ile Phe Asp Gly Asp Asn Glu Ile Leu Gln Ile Val Asp  
 465 470 475 480  
 Glu Leu Ser Glu Asp Ile Thr Lys Tyr Phe Met Lys Leu  
 485 490

<210> 44  
 <211> 12  
 <212> DNA  
 <213> Plasmodium falciparum

<400> 44  
 caagaacaac aa 12

<210> 45  
 <211> 12  
 <212> DNA  
 <213> Plasmodium falciparum

<400> 45  
 atgaaactat aa 12

<210> 46  
 <211> 1494  
 <212> DNA  
 <213> Plasmodium falciparum

<221> CDS  
 <222> (1)..(1494)

<400> 46  
 caa gaa caa caa agc gat cta gaa caa gag aga cgt gct aaa gaa aag 48  
 Gln Gln Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys  
 1 5 10 15  
 ttg caa gaa caa caa agc gat tta gaa caa gat aga ctt gct aaa gaa 96  
 Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg Leu Ala Lys Glu  
 20 25 30  
 aag tta caa gag cag caa agc gat tta gaa caa gag aga ctt gct aaa 144  
 Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys  
 35 40 45  
 gaa aag ttg caa gaa caa caa agc gat cta gaa caa gag aga cgt gct 192  
 Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala  
 50 55 60  
 aaa gaa aag ttg caa gaa caa caa agc gat tta gaa caa gag aga cgt 240  
 Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg  
 65 70 75 80  
 gct aaa gaa aag ttg caa gaa caa caa agc gat tta gaa caa gat aga 288  
 Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg  
 85 90 95  
 ctt gct aaa gaa aag tta caa gag cag caa agc gat tta gaa caa gag 336  
 Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu  
 100 105 110  
 aga cgt gct aaa gaa aag ttg caa gaa caa caa agc gat tta gaa caa 384  
 Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln  
 115 120 125

gag aga cgt gct aaa gaa aag ttg caa gaa caa caa agc gat tta gaa	432
Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu	
130 135 140	
caa gag aga ctt gct aaa gaa aag ttg caa gaa caa caa agc gat tta	480
Gln Glu Arg Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu	
145 150 155 160	
gaa caa gag aga cgt gct aaa gaa aag ttg caa gaa caa caa agc gat	528
Glu Gln Glu Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp	
165 170 175	
tta gaa caa gag aga cgt gct aaa gaa aag ttg caa gaa caa caa agc	576
Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser	
180 185 190	
gat tta gaa caa gag aga cgt gct aaa gaa aag ttg caa gag cag caa	624
Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln	
195 200 205	
aga gat tta gaa caa agg aag gct gat acg aaa aaa aat tta gaa aga	672
Arg Asp Leu Glu Gln Arg Lys Ala Asp Thr Lys Lys Asn Leu Glu Arg	
210 215 220	
aaa aag gaa cat gga gat ata tta gca gag gat tta tat ggt cgt tta	720
Lys Lys Glu His Gly Asp Ile Leu Ala Glu Asp Leu Tyr Gly Arg Leu	
225 230 235 240	
gaa ata cca gct ata gaa ctt cca tca gaa aat gaa cgt gga tat tat	768
Glu Ile Pro Ala Ile Glu Leu Pro Ser Glu Asn Glu Arg Gly Tyr Tyr	
245 250 255	
ata cca cat caa tct tct tta cct cag gac aac aga ggg aat agt aga	816
Ile Pro His Gln Ser Ser Leu Pro Gln Asp Asn Arg Gly Asn Ser Arg	
260 265 270	
gat tcc aag gaa ata tct ata ata gaa aaa aca aat aga gaa tct att	864
Asp Ser Lys Glu Ile Ser Ile Ile Glu Lys Thr Asn Arg Glu Ser Ile	
275 280 285	
aca aca aat gtt gaa gga cga agg gat ata cat aaa gga cat ctt gaa	912
Thr Thr Asn Val Glu Gly Arg Arg Asp Ile His Lys Gly His Leu Glu	
290 295 300	
gaa aag aaa gat ggt tca ata aaa cca gaa caa aaa gaa gat aaa tct	960
Glu Lys Lys Asp Gly Ser Ile Lys Pro Glu Gln Lys Glu Asp Lys Ser	
305 310 315 320	
gct gac ata caa aat cat aca tta gag aca gta aat att tct gat gtt	1008
Ala Asp Ile Gln Asn His Thr Leu Glu Thr Val Asn Ile Ser Asp Val	
325 330 335	
aat gat ttt caa ata agt aag tat gag gat gaa ata agt gct gaa tat	1056
Asn Asp Phe Gln Ile Ser Lys Tyr Glu Asp Glu Ile Ser Ala Glu Tyr	
340 345 350	

gac gat tca tta ata gat gaa gaa gaa gat gat gaa gac tta gac gaa 1104  
 Asp Asp Ser Leu Ile Asp Glu Glu Glu Asp Asp Glu Asp Leu Asp Glu  
 355 360 365  
 ttt aag cct att gtg caa tat gac aat ttc caa gat gaa gaa aac ata 1152  
 Phe Lys Pro Ile Val Gln Tyr Asp Asn Phe Gln Asp Glu Glu Asn Ile  
 370 375 380  
 gga att tat aaa gaa cta gaa gat ttg ata gag aaa aat gaa aat tta 1200  
 Gly Ile Tyr Lys Glu Leu Glu Asp Leu Ile Glu Lys Asn Glu Asn Leu  
 385 390 395 400  
 gat gat tta gat gaa gga ata gaa aaa tca tca gaa gaa tta tct gaa 1248  
 Asp Asp Leu Asp Glu Gly Ile Glu Lys Ser Ser Glu Glu Leu Ser Glu  
 405 410 415  
 gaa aaa ata aaa aaa gga aag aaa tat gaa aaa aca aag gat aat aat 1296  
 Glu Lys Ile Lys Lys Gly Lys Lys Tyr Glu Lys Thr Lys Asp Asn Asn  
 420 425 430  
 ttt aaa cca aat gat aaa agt ttg tat gat gag cat att aaa aaa tat 1344  
 Phe Lys Pro Asn Asp Lys Ser Leu Tyr Asp Glu His Ile Lys Lys Tyr  
 435 440 445  
 aaa aat gat aag cag gtt aat aag gaa aag gaa aaa ttc ata aaa tca 1392  
 Lys Asn Asp Lys Gln Val Asn Lys Glu Lys Glu Lys Phe Ile Lys Ser  
 450 455 460  
 ttg ttt cat ata ttt gac gga gac aat gaa att tta cag atc gtg gat 1440  
 Leu Phe His Ile Phe Asp Gly Asp Asn Glu Ile Leu Gln Ile Val Asp  
 465 470 475 480  
 gag tta tct gaa gat ata act aaa tat ttt atg aaa cta taa aag gtt 1488  
 Glu Leu Ser Glu Asp Ile Thr Lys Tyr Phe Met Lys Leu  
 485 490  
 ata tat 1494

&lt;210&gt; 47

&lt;211&gt; 493

&lt;212&gt; PRT

&lt;213&gt; Plasmodium falciparum

&lt;400&gt; 47

Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys  
 1 5 10 15

Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg Leu Ala Lys Glu  
 20 25 30

Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys  
 35 40 45

Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala  
 50 55 60

Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg  
 65 70 75 80  
 Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg  
 85 90 95  
 Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu  
 100 105 110  
 Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln  
 115 120 125  
 Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu  
 130 135 140  
 Gln Glu Arg Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu  
 145 150 155 160  
 Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp  
 165 170 175  
 Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser  
 180 185 190  
 Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln  
 195 200 205  
 Arg Asp Leu Glu Gln Arg Lys Ala Asp Thr Lys Lys Asn Leu Glu Arg  
 210 215 220  
 Lys Lys Glu His Gly Asp Ile Leu Ala Glu Asp Leu Tyr Gly Arg Leu  
 225 230 235 240  
 Glu Ile Pro Ala Ile Glu Leu Pro Ser Glu Asn Glu Arg Gly Tyr Tyr  
 245 250 255  
 Ile Pro His Gln Ser Ser Leu Pro Gln Asp Asn Arg Gly Asn Ser Arg  
 260 265 270  
 Asp Ser Lys Glu Ile Ser Ile Ile Glu Lys Thr Asn Arg Glu Ser Ile  
 275 280 285  
 Thr Thr Asn Val Glu Gly Arg Arg Asp Ile His Lys Gly His Leu Glu  
 290 295 300  
 Glu Lys Lys Asp Gly Ser Ile Lys Pro Glu Gln Lys Glu Asp Lys Ser  
 305 310 315 320  
 Ala Asp Ile Gln Asn His Thr Leu Glu Thr Val Asn Ile Ser Asp Val  
 325 330 335  
 Asn Asp Phe Gln Ile Ser Lys Tyr Glu Asp Glu Ile Ser Ala Glu Tyr  
 340 345 350  
 Asp Asp Ser Leu Ile Asp Glu Glu Glu Asp Asp Glu Asp Leu Asp Glu  
 355 360 365

Phe Lys Pro Ile Val Gln Tyr Asp Asn Phe Gln Asp Glu Glu Asn Ile  
 370 375 380  
 Gly Ile Tyr Lys Glu Leu Glu Asp Leu Ile Glu Lys Asn Glu Asn Leu  
 385 390 395 400  
 Asp Asp Leu Asp Glu Gly Ile Glu Lys Ser Ser Glu Glu Leu Ser Glu  
 405 410 415  
 Glu Lys Ile Lys Lys Gly Lys Lys Tyr Glu Lys Thr Lys Asp Asn Asn  
 420 425 430  
 Phe Lys Pro Asn Asp Lys Ser Leu Tyr Asp Glu His Ile Lys Lys Tyr  
 435 440 445  
 Lys Asn Asp Lys Gln Val Asn Lys Glu Lys Glu Lys Phe Ile Lys Ser  
 450 455 460  
 Leu Phe His Ile Phe Asp Gly Asp Asn Glu Ile Leu Gln Ile Val Asp  
 465 470 475 480  
 Glu Leu Ser Glu Asp Ile Thr Lys Tyr Phe Met Lys Leu  
 485 490